

## POLYMER WAVEGUIDE FABRICATION PROCESS

### ABSTRACT OF THE INVENTION

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The invention relates to a process a process for forming single-mode, organic waveguides employing organic polymeric materials. The process reduces dissolved and gaseous oxygen content to very low quantities, resulting in production of waveguides having superior properties and manufacturability. Also provided is a process for preventing loss of light due to cores having flared ends.

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A waveguide is produced by sequentially a layer of a liquid, photosensitive buffer and clad composition to a surface of a substrate; deoxygenating under vacuum; overall exposing under an inert gas actinic radiation to partially polymerize the compositions below a full curing. Coating a photosensitive core composition to

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the clad composition; deoxygenating under vacuum, covering with an inert gas atmosphere; positioning a photomask above, but not in contact with the core layer; imagewise exposing the core through a photomask pattern to actinic radiation to partially polymerize the core composition; developing core; coating a photosensitive overclad composition over the image areas of the core

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composition; deoxygenating under vacuum; overall exposing the overclad composition, under inert gas to actinic radiation to substantially fully cure the optional buffer composition, the underclad composition, the core composition and the clad composition.